

Permit Rationale

Date: September 17, 2026

Permit Writer: Ryan Olive

Facility Name: Clarence, City of STP

Location: County: Cedar
Latitude: 41 degrees, 53 minutes, 28.5 seconds
Longitude: -91 degrees, -04 minutes, -12.4 seconds

Region/ FO: DNR FO#6, Washington

Design: Controlled discharge from a four-cell waste stabilization lagoon to Mill Creek (A2, B(WW-2))

Date Constructed: 1995
Flow: AWW-180 (CDL): 0.2274 MGD
BOD5: 243 lbs/day;
P.E.: 1,455

Source: Construction Permit #95-370-S dated September 18, 1995
& Schedule G dated December 28, 1994

Treatment Plant Description: Wastewater treatment for the City of Clarence is provided by a 4-cell controlled-discharge lagoon. The facility accepts domestic waste from the City of Clarence.

Wasteload allocation: WLA dated December 4, 2020. This WLA was used for a prior permit renewal; however, the limits were calculated using current WLA methodology, design flows/loads, water quality standards, and receiving waterbody flows. Therefore, the WLA is still applicable for this proposed renewal.

Antidegradation: The discharge to be authorized under this permit does not include any new significant industrial users (SIUs) or new processes contributing new pollutants of concern. The proposed permit does not include a design capacity increase or change in outfall location and does not contain any less stringent water quality-based effluent limits. Since none of the factors that trigger a Tier II antidegradation review are present, a Tier II review is not required.

Impaired Waterbody: The following waterbodies in the discharge route are on the 2024 impaired waters list:

- Wapsipinicon River for bacteria (indicator bacteria – *E. coli*)
- Mississippi River for bacteria (indicator bacteria – fecal coliform) and toxic organics (PCBs)

There are no approved or scheduled TMDLs in the discharge route at this time.

Note that additional and/or more stringent effluent limits may be given to this facility based on any future approved TMDLs for impaired waterbodies, which may provide watershed-based wasteload allocations. Information on impaired streams in Iowa and approved TMDLs can be found at the following website: <http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement/Impaired-Waters>

Limits

Effective from permit issuance to permit expiration

Parameter	Season	7-day ave mg/L	30-day ave mg/L	daily max mg/L	min	max	30-day ave lbs/day	daily max lbs/day	max lbs/year
CBOD ₅	yearly	40	25	---	---	---	---	---	---
TSS	yearly	120	80	---	---	---	---	---	---
pH	yearly	---	---	---	6.5 s.u.	9.0 s.u.	---	---	---

Effective from 59 months after permit issuance to permit expiration

Parameter	Season	7-day ave mg/L	30-day ave mg/L	daily max mg/L	min	max	7-day ave lbs/day	30-day ave lbs/day	daily max lbs/day
NH ₃ -N	monthly	As specified in WLA dated December 4, 2020							

Basis for limits:

Technology-based limits

Five-day carbonaceous biochemical oxygen demand (CBOD₅) limits and pH maximum limits are consistent with Standard Secondary Treatment requirements identified in the Iowa Administrative Code (IAC) at 567 IAC 62.3(1)“a” and “c”. Total suspended solids (TSS) limits are consistent with Departmental secondary treatment standards for waste stabilization ponds as stated in 567 IAC 62.3(2)“c”.

Water Quality-based limits

Ammonia nitrogen and pH minimum limits are based on the water quality standards. Pollutant specific analyses are described below.

Ammonia Nitrogen

A sample for ammonia nitrogen was submitted with the application. The sample result was 1.3 mg/L. After a review of the ammonia nitrogen data submitted by the City, it is not believed that the facility will be able to consistently comply with the ammonia nitrogen limits from the December 4, 2020 WLA. Therefore, the permit includes a compliance schedule for meeting ammonia limits. Because it is unknown whether operation and maintenance changes or wastewater treatment improvements requiring a construction permit may be needed for this facility to comply with the ammonia limits, the compliance schedule requires the facility to submit a compliance strategy by [12 months from permit issuance] and progress reports every 12 months (beginning at 24 months from permit issuance). If it is determined that a construction project is needed to comply with the ammonia limits, then the compliance schedule provides a recommended timeline to ensure project completion prior to the final compliance date. Refer to the compliance schedule section below for further detail.

E. coli

A sample for *E. coli* was submitted with the application. The sample result was 97 org./100 ml. As previously noted, Mill Creek below the Clarence outfall is class A2 stream. The water quality standard for *E. coli* in a Class A2 waterbody is a geometric mean of 630 org./100 ml and a sample maximum of 2,880 org./100 ml from March 15th through November 15th. The criteria apply at “end-of-pipe.” Mill Creek becomes a Class A1 waterbody about 5.6 miles downstream of the outfall. The water quality standard for *E. coli* in a Class A1 waterbody is a geometric mean of 126 org./100 ml and a sample maximum of 235 org./100 ml from March 15th through November 15th. *E. coli* decay in Mill Creek is taken into consideration. With decay, a geometric mean of 344 org./100 ml and a sample maximum of 642 org./100 ml are protective of the A1 designated use. However, 567 IAC 62.8(2) states that “the daily sample maximum criteria for *E. coli* set forth in 567 – Chapter 61 shall not be used as an end-of-pipe permit limitation.” Therefore, only the geometric mean limit of 344 org./100 ml applies.

After a review of the *E. coli* data submitted by the facility, it appears that the facility can consistently meet the *E. coli* effluent limits from the December 4, 2020 WLA. *E. coli* monitoring will remain in the permit to help determine if limits are needed in the future.

TRC

The permit does not include limits for total residual chlorine (TRC) since the Clarence wastewater treatment facility does not currently use chlorine or employ chlorine disinfection. If the city chooses to install a chlorination/dechlorination disinfection system in the future, the permit will be reopened and TRC monitoring and limits will be added.

Chloride & Sulfate

As part of its NPDES permit renewal application, the City of Clarence submitted chloride and sulfate sample results of 170 mg/L and 4.5 mg/L, respectively. The chloride result of 170 mg/L was less than 50% of 30-day average limit (396 mg/L) calculated in the December 4, 2020 WLA. Therefore, there is no reasonable potential for the discharge to violate the chloride WQS and no chloride limits have been proposed.

The sulfate sample value of 4.5 mg/L is well below the 30-day average and daily maximum (1,516 mg/L) sulfate limits calculated in the December 4, 2020 WLA. Therefore, there is no reasonable potential for the discharge to violate the sulfate WQS and no sulfate limits have been proposed.

Dissolved Oxygen

A sample for dissolved oxygen was submitted with the application. The sample result was 7.4 mg/L. The December 4, 2020 WLA determined that effluent from the Clarence facility must maintain a minimum 5.0 mg/L for dissolved oxygen. However, the Department does not consider there to be a reasonable potential for the discharge to violate the calculated limit for dissolved oxygen based on the drawdown nature and design standards for controlled discharge lagoons. Chapter 18C of the Iowa Wastewater Facilities Design Standards requires controlled discharge lagoons to include evenly spaced, multi-level cell drawdown pipes. As the pipes discharge into the effluent structure, the resulting turbulence allows mixing of additional oxygen, raising the dissolved oxygen level being discharged into the receiving stream. Due to these factors, the permit does not include limits or monitoring for dissolved oxygen.

The City of Clarence was also required to test for nitrate + nitrite nitrogen, Total Kjeldahl Nitrogen (TKN), oil and grease, and total phosphorus.

Oil & Grease

The oil and grease sample submitted with the application was <5.0 mg/L. We only have a narrative standard for oil and grease. In most cases if oil and grease is below 10 mg/L, there should not be a visible sheen.

TKN, Nitrate + Nitrite Nitrogen and Total Phosphorous

The total phosphorus sample result was 3.6 mg/L. There are no Water Quality Standards (WQS) for phosphorus. The nitrate + nitrite nitrogen sample result was <0.25 mg/L. The standard for nitrate applies only to Class "C" waters that are used for drinking water which Mill Creek is not. The TKN sample result was 8.5 mg/L. There are no WQS for TKN. Based on information currently available the Department cannot make a reasonable potential determination for the narrative WQS in IAC 567-61.2(3) specific to nitrogen and/or phosphorus. However, NPDES permits are protective of Iowa's narrative standards that apply at all times to all surface waters regardless of whether or not the standards are specifically included in the permit. The Department is addressing nitrogen and phosphorus discharges from point sources through the Iowa Nutrient Reduction Strategy.

Backsliding: The permit has been reviewed for anti-backsliding according to sections 303(d)(4) and 402(o) of the Clean Water Act and 40 CFR 122.44. All limits and conditions proposed in this permit are at least as stringent as those in the previous permit. Backsliding is not occurring.

Effluent Toxicity: The facility discharges less than 1 MGD; therefore no toxicity testing is required.

Monitoring Basis: Compliance monitoring is based on 567 IAC 63, Table I for population equivalent (P.E.) Category >1,001.

Special Monitoring: See the special monitoring page(s) in the permit for the CBOD₅ and *E. coli* special monitoring language.

Sludge: Sludge disposal is not expected. If disposal is required, sludge must be land applied according to 567 IAC 67 land application rules or otherwise disposed of in accordance with the Federal regulations in 40 CFR 503. No adverse environmental or public health impacts have been identified.

Compliance Schedule (Ammonia Nitrogen): Per the Subrule at 567 IAC 64.7(4), the Department is authorized to include schedules of compliance in NPDES permits.

For reasons described above, the permit includes a compliance schedule for meeting the ammonia nitrogen limits. The compliance schedule requires the facility to submit a compliance strategy by [12 months from permit issuance]. The compliance strategy shall describe the steps the facility will take to comply with the ammonia limits *as soon as possible*, but by no later than [59 months from permit issuance date]. The compliance schedule also requires the facility to submit progress reports to the Department every 12 months (beginning at 24 months from permit issuance) that detail completion of the steps described in the compliance strategy. If it is determined that a construction project is needed to comply with the limits, then the compliance schedule provides a recommended timeline to ensure project completion prior to the final compliance date. This recommended timeline takes into consideration the time it takes to conduct antidegradation review, design the project, obtain the appropriate permits, secure funding, construct the equipment, and obtain a level of operation.

Special Note: The DNR recently updated Chapter 63 of the Iowa Administrative Code which contains the monitoring and reporting requirements for NPDES permits. Most of the prescribed requirements for operational monitoring have been removed from Chapter 63; two requirements (TRC and lagoon cell depth) remain. While your reissued NPDES permits does not include the operational monitoring requirements of the past, the rule requires permittees to perform operational monitoring to ensure proper facility operation in accordance with the facility design, and requires permittees to maintain records of operational monitoring for three years. Thus, necessary operational monitoring can be performed at the discretion of your facility upon reissuance. Please note that operational monitoring requirements can still be placed in permits on a case-by-case basis.

City of Clarence

(Please do not microfiche this document.)

This Package Contains

WASTELOAD ALLOCATION CALCULATIONS & NOTES

Please Do Not Separate

**ENVIRONMENTAL SERVICES DIVISION
WATER QUALITY-BASED PERMIT LIMITS**

SECTION VI: WATER QUALITY-BASED PERMIT LIMITS

Facility Name: Clarence, City of STP

Sewage File Number: 6-16-30-0-01

Parameters	Ave. Conc. (mg/l)	Max. Conc. (mg/l)	Ave. Mass (lbs/d)	Max. Mass (lbs/d)
Outfall No. 001	Drawdown Rate: 2.274 MGD			
CBOD5	Secondary Treatment Levels Will Not Violate WQS			
Total D.O.	Minimum Concentration (mg/l)			
January - December	5.0			
Ammonia – Nitrogen ¹				
January	3.5	19.9	66.4	377.5
February	4.1	8.4	77.0	159.7
March	3.5	3.9	66.4	73.8
April	2.0	4.8	37.2	90.1
May	2.2	3.2	42.5	61.6
June	1.7	3.2	32.0	61.6
July	1.0	3.2	19.6	60.9
August	1.0	2.7	18.6	50.4
September	1.1	2.7	20.6	50.4
October	1.7	2.7	33.0	50.6
November	2.6	2.7	49.2	50.6
December	2.8	3.9	52.5	74.0
Bacteria	Geometric Mean (#org./100 ml)		March 15 th – November 15 th	
E. coli	344			
Chloride	396	630	7,509	11,947
Sulfate	1,516	1,516	28,758	28,758
TRC ²	0.011	0.019	0.21	0.36
pH	6.5-9.0 Standard Units			

Stream Network/Classification of Receiving Stream: Mill Creek (A2, B(WW-2) to A1, B(WW-2))

Spring seasonal critical low flows in Mill Creek at the outfall:

1Q10 flow 0.53 cfs, 7Q10 flow 0.63 cfs, 30Q10 flow 1.03 cfs

Fall seasonal critical low flows in Mill Creek at the outfall:

1Q10 flow 0.26 cfs, 7Q10 flow 0.29 cfs, 30Q10 flow 0.42 cfs

Annual critical low flows in Mill Creek at the outfall:

1Q10 flow 0.1 cfs, 7Q10 flow 0.1 cfs, 30Q10 flow 0.1 cfs

Excel spreadsheet calculations ☒ [X]

Qual II E model ☐ []

Qual II E modeling date ☐ []

Performed by: Alex Martin

1: CDLs are only allowed to discharge in two specific periods of time a year. Monthly ammonia nitrogen limits do not imply that discharge is allowed in all months.

2: Only required if chlorination is used for disinfection

Antidegradation Review Requirement

A tier II antidegradation review is not required. See Section 2 for details.

Please note that the antidegradation review conducted in this wasteload allocation is based on the current information available. Antidegradation could also be triggered during the NPDES permitting process based on new information.

WLAs/Permit Limits for the City of Clarence's Controlled Discharge Lagoon

These wasteload allocations and water quality-based permit limitations are for the City of Clarence's wastewater discharge. The wasteload allocations/permit limits are based on the Water Quality Standards (IAC 567.61) and the "Iowa Wasteload Allocation (WLA) Procedure," effective November 11, 2020. The chloride allocation/permit limits are based on the criteria that became effective on November 11, 2009.

The water quality-based limits in this WLA are calculated to meet the surface water quality criteria to protect downstream uses. There could be technology-based limits applicable to this facility that are more stringent than the water quality-based limits shown in this WLA. The technology-based limits could be derived from either federal guidelines based on different industrial categories or permit writer's judgment.

1. BACKGROUND:

The City of Clarence discharges treated domestic wastewater from a controlled discharge lagoon into Mill Creek (at 41° 53' 44.7" N, 91° 04' 19.4" W).

Route of flow and use designations:

The receiving segment of Mill Creek is a recommended A2, B(WW-2) designated use waterbody. EPA has approved the recommended designations; however, only the recreational use (A2) is listed in the rule-referenced document of "Surface Water Classification," effective July 24, 2019. The aquatic use is missing; this is a typographical error and will be fixed in the next version of the Surface Water Classification Document. It flows into an A1, B(WW-2) segment of Mill Creek. This WLA is based on the designations A2, B(WW-2) for Mill Creek. Based on the pollutants of concern, the use designations of waterbodies further downstream will not impact the resulting limits for this facility.

Critical low flow determination:

The spring (April – June) and fall (October – December) seasonal critical low flows in Mill Creek at the outfall are estimated based on the Regional Regression Equations (RRE) from "Methods for estimating selected spring and fall low-flow frequency statistics for ungaged stream sites in Iowa, based on data through June 2014" (2016).

The annual critical low flows in Mill Creek at the outfall are estimated based on the Regional Regression Equations (RRE) from "Methods for estimating selected low-flow frequency statistics and harmonic mean flows for streams in Iowa" (2012, revised 2017).

Table 1: Stream critical low flows

Location	D.A. (mi ²)	Season	1Q10 (cfs)	7Q10 (cfs)	30Q10 (cfs)
Mill Creek at the outfall	9.17	Spring	0.53	0.63	1.03
		Fall	0.26	0.29	0.42
		Annual	0.1	0.1	0.1

2. ANTIDegradation REVIEW:

According to the “Iowa Antidegradation Implementation Procedure,” effective February 17, 2010 (IAC 567-61.2(2).e), all new or expanded regulated activities (with limited exceptions, such as unsewered communities) are subject to antidegradation review requirements.

Table 2: Antidegradation review analysis

Item #	Factor or scenario	Antidegradation determination	Analysis/comments
1	Design capacity increase	Yes ☐ , No ☒ , or Not Applicable ☐	
2	Significant Industrial Users (SIU) contributing new pollutant of concern (POC)	Yes ☐ , No ☐ , or Not Applicable ☒	
3	New process contributing new pollutant of concern (POC)	Yes ☐ , No ☐ , or Not Applicable ☒	1: Note that if chlorine is utilized for disinfection in the future an antidegradation review will be required.
4	Less stringent water quality-based limits?	Yes ☐ , No ☒ , or Not Applicable ☐	
5	Outfall location change	Yes ☐ , No ☒ , or Not Applicable ☐	
Conclusion and discussion:			
None of the factors trigger the antidegradation review; therefore, a tier II antidegradation review is not required.			
Please note that the antidegradation review conducted in this WLA is based on the current information available. Antidegradation could also be triggered during the NPDES permitting process based on new information.			

3. TOTAL MAXIMUM DAILY LOAD (TMDL) LIMITATIONS:

The following waterbodies in the discharge route are on the 2018 impaired waters list:

- Wapsipinicon River for bacteria (indicator bacteria – *E. coli*)
- Mississippi River for bacteria (indicator bacteria – fecal coliform), metals (aluminum), and toxic organics (PCBs)

There are no approved or scheduled TMDLs in the discharge route at this time.

Please note that the results presented in this report are wasteload allocations based on meeting the State’s current water quality standards in the receiving waterbody. Additional and/or more stringent effluent limits may be applicable to this discharge based on approved TMDLs for impaired waterbodies, which may provide watershed based wasteload allocations. Information on impaired streams in Iowa and approved TMDLs can be found at the following website: <http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement/Impaired-Waters>.

4. CALCULATIONS:

The WLAs/permit limits for this outfall are calculated based on a drawdown rate of 2.274 MGD, which is 10 times the facility’s 180-day Average Wet Weather (AWW) design flow of 0.2274 MGD.

Please note that only wasteload allocations/permit limits (water quality-based effluent limits) calculated using DNR approved design flows can be applied in NPDES permits. Water quality-based effluent limits calculated using proposed flows that have not been approved by the DNR for permitting and compliance may be used for informational purposes only.

The water quality-based permit concentration and loading limits are derived using the allowed stream flow and the drawdown rate.

Toxics and TRC:

The toxics and TRC wasteload allocations will consider the procedures included in the 2000 revised WQS and the 2007 chemical criteria. Important to toxics and TRC is the use of the 1Q10 stream flow in association with the acute wasteload allocation calculation. The chronic WLA will continue to use the 7Q10 stream flow in its calculations. In this case, 25% of the fall seasonal 7Q10 flow and 2.5% of the fall seasonal 1Q10 flow in Mill Creek at the outfall are used as the Mixing Zone (MZ) and the Zone of Initial Dilution (ZID), respectively.

The TRC and toxics limits are calculated based on a sampling frequency of 1/week.

Ammonia Nitrogen:

Standard stream background pH, temperatures, and concentrations of NH₃-N are mixed with the discharge from the facility's effluent pH and temperature values to calculate the applicable instream criteria for the protection of Mill Creek. Mill Creek is a B(WW-2) stream; therefore, early life protection will begin in April and run through September.

Based on the ratio of the stream flow to the discharge flow, 5.0% of the spring seasonal 1Q10 flow and 100% of the spring seasonal 30Q10 flow in Mill Creek at the outfall are used as the ZID and the MZ for the months of April – June, respectively. Based on the ratio of the stream flow to the discharge flow, 5.0% of the fall seasonal 1Q10 flow and 100% of the fall seasonal 30Q10 flow in Mill Creek at the outfall are used as the ZID and the MZ for the months of October – December, respectively. Based on the ratio of the stream flow to the discharge flow, 5.0% of the annual 1Q10 flow and 100% of the annual 30Q10 flow in Mill Creek at the outfall are used as the ZID and the MZ for the months of January – March and July – September, respectively.

The monthly background pH, temperatures, and NH₃-N concentrations shown in Table 3 are used for the wasteload allocation/permit limits calculations based on the Year 2000 ammonia nitrogen criteria. The statewide effluent pH and temperature values for CDLs have not been established. Table 4 shows the statewide monthly effluent pH and temperature values for aerated facultative lagoons, which are used in the calculations of ammonia nitrogen limits. Table 5 shows the calculated ammonia nitrogen wasteload allocations for this facility.

Table 3: Background pH, temperatures, and NH₃-N concentrations
for use with Year 2000 ammonia nitrogen criteria

Months	pH	Temperature (°C)	NH ₃ -N (mg/l)
January	8.1	0.3	0.02
February	8.0	0.1	0.08
March	8.1	1.5	0.12
April	8.3	9.3	0.03
May	8.2	15.0	0.03
June	8.2	19.4	0.02
July	8.2	23.5	0.02
August	8.2	24.3	0.02
September	8.3	20.2	0.02
October	8.3	14.2	0.02
November	8.3	8.0	0.02
December	8.3	0.8	0.03

Table 4: Standard effluent pH and temperature values for aerated facultative lagoon facilities

Months	pH	Temperature (°C)
January	7.5	4.5
February	8.0	8.1
March	8.4	8.7
April	8.3	14.6
May	8.5	18.8
June	8.5	22.8
July	8.5	25.3
August	8.6	25.3
September	8.6	22.2
October	8.6	16.6
November	8.6	12.4
December	8.4	8.4

Table 5: Wasteload allocations for ammonia nitrogen for the protection of aquatic life

Months	Drawdown rate-based*	
	Acute (mg/l)	Chronic (mg/l)
January	19.9	3.5
February	8.4	4.1
March	3.9	3.5
April	4.8	2.0
May	3.2	2.2
June	3.2	1.7
July	3.2	1.0
August	2.7	1.0
September	2.7	1.1
October	2.7	1.7
November	2.7	2.6
December	3.9	2.8

*: bases for concentration limits and for mass loading limits

CBOD5/Total Dissolved Oxygen:

Streeter-Phelps DO Sag Model is used to simulate the decay of CBOD and dispersion of total Dissolved Oxygen (DO) in the receiving water downstream from the outfall. The criterion is that the discharge cannot cause the DO level in the receiving stream (warm water) to be below 5.0 mg/l.

The parameter values used in the modeling are listed below:

Background:

The temperature and ammonia nitrogen levels are shown in Table 3. The ultimate CBOD and DO levels are assumed to be 6.0 mg/l and 6.0 mg/l, respectively.

Effluent:

The temperatures are shown in Table 4. The CBOD5 level used in the modeling is 40 mg/l, which is the technology-based maximum limit for standard secondary treatment. The ammonia nitrogen values used in the modeling are the calculated acute wasteload allocations shown in Table 5. The drawdown rate and the ammonia nitrogen limits associated with it are used in the modeling.

Receiving stream parameters:

There is an average water channel slope of 0.00138 (the water channel elevation changes from 788 ft to 748 ft over a distance of approximately 28,960 ft, estimated based on the GIS LiDAR 2-ft contour coverage).

Field Use Attainability Assessment (UAA) had four sites along Mill Creek. Two observations of stream width, average depth and velocity were made at two sites in relatively close proximity to this facility. One observation was missing velocity data and was not included in the calculations. Based on these UAA data, stream width, depth, and velocity at spring, fall, and annual 7Q10 + drawdown rate conditions are estimated and are shown in Table 6.

Table 6: Stream width, depth, and velocity

Flow Condition	Flow (cfs)	Width (ft)	Depth (ft)	Velocity (fps)
Spring 7Q10 + Drawdown	4.15	8.84	1.37	0.34
Fall 7Q10 + Drawdown	3.81	8.75	1.32	0.33
Annual 7Q10 + Drawdown	3.62	8.70	1.29	0.32

Reaeration:

The USGS pool-riffle model (Melching and Flores, 1999) was used as pools and riffles are noted in the UAA data.

Discussion and conclusion:

The modeling results show that the effluent, which could have an allowed maximum effluent CBOD5 level of 40 mg/l (technology-based limits for secondary treatment), ammonia nitrogen levels as shown in Table 5, and a minimum DO level of 5.0 mg/l, will not cause the DO level in the receiving stream to be below 5.0 mg/l at any time.

E. coli:

This facility discharges into a Class A2 waterbody. The water quality standard for *E. coli* in a Class A2 waterbody is a geometric mean of 630 org./100 ml and a sample maximum of 2,880 org./100 ml from March 15th through November 15th. The criteria apply at “end-of-pipe.”

Mill Creek becomes a Class A1 waterbody about 5.6 miles downstream of the outfall. The water quality standard for *E. coli* in a Class A1 waterbody is a geometric mean of 126 org./100 ml and a sample maximum of 235 org./100 ml from March 15th through November 15th. *E. coli* decay in Mill Creek is taken into consideration. A first order decay model with a decay rate of 1.0 per day at 20°C and an assumed velocity of 0.34 fps in Mill Creek are used to estimate the decay. With decay, a geometric mean of 344 org./100 ml and a sample maximum of 642 org./100 ml are protective of the A1 designated use.

However, 567 IAC 62.8(2) states that “the daily sample maximum criteria for *E. coli* set forth in 567 – Chapter 61 shall not be used as an end-of-pipe permit limitation.” Therefore, only the geometric mean limit of 344 org./100 ml applies.

Chloride and Sulfate:

The chloride and sulfate criteria became effective on November 11, 2009 and apply to all Class B waters. The default hardness for background and effluent is 200 mg/l.

Chloride criteria are functions of hardness and sulfate concentration, shown as follows:

$$\begin{aligned}\text{Acute criteria} &= 287.8 * (\text{Hardness})^{0.205797} * (\text{Sulfate})^{-0.07452} \\ \text{Chronic criteria} &= 177.87 * (\text{Hardness})^{0.205797} * (\text{Sulfate})^{-0.07452}\end{aligned}$$

Sulfate criteria, shown in Table 7, are functions of hardness and chloride concentration and serve as both the acute and chronic criteria.

Table 7: Sulfate criteria

Hardness (mg/l as CaCO ₃)	Sulfate criteria (mg/l)		
	Chloride < 5 mg/l	5 mg/l ≤ Chloride < 25 mg/l	25 mg/l ≤ Chloride < 500 mg/l
< 100	500	500	500
100 ≤ H ≤ 500	500	$(-57.478 + 5.79 * H + 54.163 * Cl) * 0.65$	$(1276.7 + 5.508 * H - 1.457 * Cl) * 0.65$
H > 500	500	2,000	2,000

The acute criteria apply at the end of the ZID, and the chronic criteria apply at the end of the MZ. In this case, 25% of the fall seasonal 7Q10 flow and 2.5% of the fall seasonal 1Q10 flow in Mill Creek at the outfall are used as the MZ and the ZID, respectively.

The default chloride concentration for both background water and effluent is 34 mg/l, while the default sulfate concentration for both background water and effluent is 63 mg/l. The limits are calculated based on an assumed sampling frequency of 1/week.

pH:

Iowa Water Quality Standards (IAC 567.61.3.(3).a.(2) and IAC 567.61.3.(3).b.(2)) require that pH in Class A or Class B waters “shall not be less than 6.5 nor greater than 9.0.” The criteria apply at the end of the MZ, which is 25% of the fall seasonal 7Q10 flow in Mill Creek at the outfall.

TDS:

Effective November 11, 2009, the site-specific TDS approach is no longer applicable; instead, the new chloride and sulfate criteria became applicable. However, the TDS level should be controlled to a level such that the narrative criteria stated in IAC 567.61.3 are fulfilled.

5. PERMIT LIMITATIONS:

- Based on the Year 2006 Water Quality Standards and 2002 Permit Derivation Procedure.

The acute and chronic WLAs are used as the values for input into the current permit derivation procedure. Under the 2002 permit derivation procedure, only for toxic parameters is the monitoring frequency considered in the calculation of final limits. The water quality-based limits are shown on Page 1 of this report.

es

STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES
HENRY A. WALLACE BUILDING
DES MOINES, IOWA 50319

CONSTRUCTION PERMIT

Attn. : Ms. Rosalie Sheldon

PERMIT NO.: 95-370-S

City Clerk

FILE: Clarence 6-16-30-0-01

City Hall

RE: S94-141

Clarence, Iowa 52216

PROJECT NO: CS192084 01

In accordance with the provisions of Section 455B.173.3 and 455B.174.4, Code of Iowa, and Rule 567--64.2(455B) or Rule 567--65.6(455B), or Rule 567--43.3(455B) of the Iowa Administrative Code, the Director of the Department of Natural Resources does hereby issue a permit for the construction of:

A four cell controlled discharge lagoon system having a storage capacity of 180 days at an average wet weather flow of 0.227 MGD. The lagoon system will consist of two primary lagoons each having a surface area of 10.8 acres and two secondary lagoons with surface areas of 7.4 acres and 7.8 acres at maximum operational depth of each cell. The related work includes manholes, influent structure, piping, gates, effluent structure, weir box, intercell piping and valves, subdrain, fencing, seeding, rip rap, 90 lin. ft. of 4 inch dia force main and a lift station with a firm pumping capacity of 400 gpm, including wet well, pumps, controls, piping etc. as has been described in detail in projects plans and specifications.

The treatment facility is designed to treat a peak month organic loading of 242.8 lbs of BOD5 per day while handling a AWW flow of 0.227 mgd. The facility has been designed to meet standard secondary limits.

The City of Clarence shall maintain a complete manual for the operation and maintenance of its wastewater treatment system. The manual shall be prepared by a registered engineer.

The construction of the project shall be initiated within one year of issuance of this permit or this permit is no longer valid. Within thirty days after completion of construction, the permit holder shall submit a certification by a registered professional engineer that the project was completed in accordance with the approved project documents.

The construction and disbursement schedules provided to the Department do not correspond with the deadlines specified in Administrative Order No. 93-WW-23. This does not imply that the city is excused from compliance with deadlines contained in the Administrative Order.

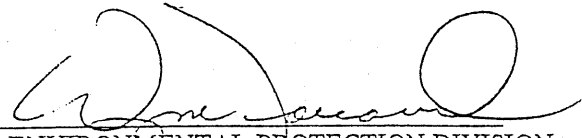
Pursuant to Section 455B.174.4, Code of Iowa, you have the right to appeal any condition of this permit by filing with the Director of the Department of Natural Resources a notice of appeal and request for administrative hearing within thirty days of receipt of this permit.

Contact Mike Hameed at 515/242-6199 with any questions or comments.

For the Department of Natural Resources

Larry J. Wilson, Director

By:



ENVIRONMENTAL PROTECTION DIVISION

Date: September 18, 1995

cc: Anderson Bogert Engineers
Field Office #6

Plan Distribution [0] Engineer; [1] Field Office #6; [1] DNR File; [1] City of Clarence

18. Effluent Testing Information for All Facilities

All applicants that discharge to surface waters must provide the results of analysis of at least one sample of the final effluent for the following parameters, regardless of whether or not the parameters below are included in the facility's current NPDES permit. Testing is required for each active outfall through which effluent is discharged. Collect samples as indicated by the bolded letters. C indicates 24-hour composite and G indicates grab. If the discharge is from a controlled discharge lagoon, a grab sample is acceptable in lieu of a 24-hour composite. Effluent testing data required by your current NPDES permit can be used if it meets these requirements. If only one sample is taken, report the results in the "Maximum Daily Value" column. Do not include information on CSOs here.

Outfall Number (e.g. 001, 002): 001

Pollutant	Maximum Daily Value	Average Daily Value (last year)	Number of Measurements	Certified Laboratory #	Reporting Level (MDL)
Chloride C			1	27	170
Sulfate C			1	27	4.5
E.coli G			1	27	97

19. Effluent Testing Information for Facilities with Design AWW Flow Greater Than 0.1 MGD

Applicants whose facility has a design wet weather (AWW) flow of greater than or equal to 0.1 MGD (100,000 gal/day) and that discharge to surface waters must provide the results of analysis of at least one sample of the final effluent for the following parameters, regardless of whether or not the parameters below are included in the facility's current NPDES permit. Testing is required for each active outfall through which effluent is discharged. The samples collected must be representative of the current operation and should be collected during dry weather. Collect samples as indicated by the bolded letters. C indicates 24-hour composite and G indicates grab. If the discharge is from a controlled discharge lagoon, a grab sample is acceptable in lieu of a 24-hour composite. Effluent testing data required by your current NPDES permit can be used if it meets these requirements. If only one sample is taken, report the results in the "Maximum Daily Value" column. Do not include information on CSOs in this section. "Other" parameters will be specified by the permit writer as needed. Note: if the design AWW flow of the facility is less than 0.1 MGD, this question does not need to be completed.

Outfall Number (e.g. 001, 002): 001

Pollutant	Maximum Daily Value	Average Daily Value (last year)	Number of Measurements	Certified Laboratory #	Reporting Level (MDL)
Ammonia (as N) C			1	23 27	1.3
Chlorine, Total Residual (TRC) G*			0	27	0
Dissolved Oxygen G			1	27	7.4
Nitrate plus Nitrite Nitrogen C			1	27	40.25
Total Kjeldahl Nitrogen C			1	27	8.5
Oil and Grease G			1	27	<5.0
Phosphorus (Total) C			1	27	3.6
Other					

*Facilities that do not use chlorine for disinfection and do not use chlorine elsewhere in the treatment process are not required to provide TRC effluent results.



STATE HYGIENIC
LABORATORY

ANALYTICAL REPORT

1-800-421-IOWA (4692)

Collection Location clarence effluent	Collector and Phone ihns steve 563/889-0003	Client Reference dnr permit renewal	Accession # 2741047
CLARENCE,	Collected 2025-10-15 07:15	Received 2025-10-15 09:00	Project
Report To CLARENCE WATER SUPPLY 411 LOMBARD ST PO BOX 418 CLARENCE, IA 52216	Sample Description waste water		
	Sample Type Non-Drinking Water		
	Sample Source		
	Sample Note(s) 1		

RESULTS OF ANALYSIS - FINAL REPORT

TEST	RESULT (mg/L)	QUANT LIMIT	ANALYSIS NOTE(S)
Field Dissolved Oxygen, ASTM D 888-09 C Dissolved Oxygen	7.4	CORRECTED REPORT 1 0.1	2, 3
TEST	RESULT ([MPN]/100mL)	QUANT LIMIT	ANALYSIS NOTE(S)
E.coli Bacteria, SM 9223 B E.coli	97	10	
TEST	RESULT (mg/L)	QUANT LIMIT	ANALYSIS NOTE(S)
Ammonia as N, EPA 350.1 Ammonia nitrogen as N	1.3	0.1	
Chloride, EPA 300.0 Chloride	170	0.2	
Sulfate, EPA 300.0 Sulfate	4.5	0.2	
Nitrate + Nitrite as N, EPA 353.2 Nitrate + Nitrite nitrogen as N	<0.25	0.25	
Total Phosphorus as P, EPA 365.1 Phosphorus	3.6	0.05	
Total Kjeldahl Nitrogen as N, EPA 351.2 Total Kjeldahl Nitrogen as N	8.5	0.5	
TEST	RESULT (ppm)	QUANT LIMIT	ANALYSIS NOTE(S)
Oil and Grease (Hexane Extractable Material), EPA 1664 Hexane Extractable Material (HEM)	<5.0	5.0	

SAMPLE AND ANALYSIS NOTES

1. Unless otherwise noted, the sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.
2. Dissolved oxygen analysis was performed in the lab 7 hours after collection. The temperature the at time of analysis was 8.5 C.

Results may not reflect dissolved oxvaen value at time of collection. EPA procedures recommend DO analysis should be